

## NETWORK EDGE CONTROLLER AND REMOTE FIELD SERVICE SYSTEM

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 16/490,007 filed on Aug. 28, 2019, and is related to U.S. Provisional Patent Application Ser. No. 62/529,894 filed on Jul. 7, 2017 and Provisional Patent Application Ser. No. 62/641,627 filed on Mar. 12, 2018, and priority is claimed for these earlier filings under 35 U.S.C. § 119(e). These Provisional Patent Applications are also incorporated by reference into this utility patent application.

### TECHNICAL FIELD OF THE INVENTION

[0002] The present invention relates to a network edge controller and mobile communication remote field service system.

### BACKGROUND OF THE INVENTION

[0003] Computers and computer networks have transformed the society and the work environment since their introduction in mass to the business community and the consuming public. The impact we see today on the way business is conducted and consumers interact with service providers and product retailers is rooted in the technological developments in the recent past.

[0004] Present-day Internet communications represent the synthesis of technical developments begun in the 1960s—the development of a system to support communications between different United States military computer networks, and the subsequent development of a system to support the communication between research computer networks at United States universities. These technological developments would subsequently revolutionize the world of computing.

[0005] The Internet, like so many other high tech developments, grew from research originally performed by the United States Department of Defense. In the 1960s, Defense Department officials began to notice that the military was accumulating a large collection of computers—some of which were connected to large open computer networks and others that were connected to smaller closed computer networks. A network is a collection of computers or computer-like devices communicating across a common transmission medium. Computers on the Defense Department's open computer networks, however, could not communicate with the other military computers on the closed systems.

[0006] In the 1960s, the Defense Department developed a communication system that would permit communication between these different computer networks. Recognizing that a single, the Defense Department recognized that developing a centralized communication system would be vulnerable to attacks or sabotage, so the Defense Department required that their new communication system be decentralized with no critical services concentrated in vulnerable failure points. In order to achieve this goal, the Defense Department established a decentralized communication protocol for communication between their computer networks.

[0007] A few years later, the National Science Foundation (NSF) established a communication system that facilitated communication between incompatible network computers at various research institutions across the country. The NSF

adopted the Defense Department's protocol for communication, and this combination of research computer networks would eventually evolve into the Internet.

[0008] The Defense Department's communication protocol governing data transmission between different networks was called the Internet Protocol (IP) standard. The IP standard has been widely adopted for the transmission of discrete information packets across network boundaries. In fact, the IP standard is the standard protocol governing communications between computers and networks on the Internet.

[0009] The IP standard identifies the types of services to be provided to users and specifies the mechanisms needed to support these services. The IP standard also specifies the upper and lower system interfaces, defines the services to be provided on these interfaces, and outlines the execution environment for services needed in the system.

[0010] A transmission protocol, called the Transmission Control Protocol (TCP), was developed to provide connection-oriented, end-to-end data transmission between packet-switched computer networks. The combination of TCP with IP (TCP/IP) forms a suite of protocols for information packet transmissions between computers on the Internet. The TCP/IP standard has also become a standard protocol for use in all packet switching networks that provide connectivity across network boundaries.

[0011] In a typical Internet-based communication scenario, data is transmitted from an originating communication device on a first network across a transmission medium to a destination communication device on a second network. After receipt at the second network, the packet is routed through the network to a destination communication device. Because standard protocols are used in Internet communications, the IP protocol on the destination communication device decodes the transmitted information into the original information transmitted by the originating device.

[0012] A computer operating on a network is assigned a unique physical address under the TCP/IP protocols. This is called an IP address. The IP address can include: (1) a network ID and number identifying a network, (2) a sub-network ID number identifying a substructure on the network, and (3) a host ID number identifying a particular computer on the sub-network. A header data field in the information packet will include source and destination addresses. The IP addressing scheme imposes a consistent addressing scheme that reflects the internal organization of the network or sub-network.

[0013] A router, agent or gateway is used to regulate the transmission of information packets into and out of the computer network. Routers interpret the logical address contained in information packet headers and direct the information packets to the intended destination. Information packets addressed between computers on the same network do not pass through the router to the greater network, and as such, these information packets will not clutter the transmission lines of the greater network. If data is addressed to a computer outside the network, the router forwards the data onto the greater network.

[0014] Mobile communications and cellular telephony systems have become smaller, lighter, and more powerful, which improved the ability to communicate with individuals on an exponential basis. The Internet protocols were originally developed with an assumption that Internet users would be connected to a single, fixed network. With the